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as other signs were probably used earlier in cylinder seal designs, but the system as such was designed in one fell swoop. Those who favor an evolutionary model of the development of writing cite certain "antecedents" to proto-cuneiform: rough clay containers ("bullae") that enclosed simple counters and were impressed with the shape of the counters, and sealed; as well as the so-called numerical tablets; that is, clay tablets with the impressions of counters. It has been proposed that the hollow bullae were flattened, and this produced the first tablets. These, in turn, were impressed with the shape of the clay counters (Schmandt-Besserat 1992). The inventor or inventors of proto-cuneiform drew on a variety of such ideas, but the quantum leap to the conceptualization of the earliest writing system was without precedent.

The only other contemporary writing system was the hitherto undeciphered Proto-Elamite script used over a wide area of southwest and central Iran. The first tablets in Proto-Elamite are slightly later than proto-cuneiform—conventionally they are regarded as contemporary with Uruk III—and the relation between the two systems is unclear. Both use the same numerical notation, and they share at least one sign; but other than that, there is little that one can say about the differences and similarities between the two (see SECTION 10).

Distribution and contents

Aside from the tablets found at Uruk, archaic texts of period III have been found further north at Jemdet Nasr, possibly at nearby Tell Uqair, and at Fara; and some, of unknown provenance, have been purchased on the antiquities market. This means that the writing conventions first attested, and perhaps invented, at Uruk were rapidly adopted by other Mesopotamian polities. The largest group of over 200 tablets, from Jemdet Nasr (Englund and Grégoire 1991), consists of texts that are very similar to the Uruk III materials.

The majority of Uruk archaic texts are administrative documents. These comprise texts dealing with such matters as animal husbandry, grain distribution, land, animal and personnel management, and the processing of fruits and cereals. Approximately 15% are not economic: these are lists of words arranged by semantic class and by sign design, commonly known as lexical lists (Englund and Nissen 1993). There are lists of wooden objects, professional names, fish, plants, and other subjects. These differ from the accounts in a number of respects: they are preserved in multiple copies (as many as 163 for the professions list), some duplicates were found outside Uruk, and they were copied by later scribes for hundreds of years. These lexical texts have been interpreted in a variety of ways, but most scholars agree that they were manuals for the teaching of writing. This demonstrates that from the beginning there was a concern for the structured transmission of the system from generation to generation, and that the method of instruction was passed on along with the practical knowledge of the script.

Sumerian and Akkadian

JERROLD S. COOPER

Cuneiform script was used to represent the Sumerian language (Thomsen 1984) in southern Mesopotamia from ca. 3200 B.C.E., and was adapted to write Semitic dialects in Mesopotamia and Syria by 2500. Although Sumerian had become extinct as a spoken language by the early second millennium, it continued to be used for religious and legal purposes, and was studied and written until the beginning of the current era. Cuneiform texts in the Semitic dialect family we call Akkadian (Reiner 1966) appear in southern Mesopotamia beginning around 2350 (the dialect is called Old Akkadian); and after 2000, texts are written in two dialects, the Babylonian, originating in southern Mesopotamia, and Assyrian, originating in northern Mesopotamia. These are chronologically distinguished as Old Babylonian/Assyrian, Middle Babylonian/Assyrian, and Neo-Babylonian/-Assyrian, representing the dialects of, roughly, the first half of the second millennium, the second half of the second millennium, and the first half of the first millennium respectively. The Akkadian cuneiform that continued to be used into the Seleucid period in Babylonia is called Late Babylonian, and the language used for literary and commemorative inscriptions in the late second and the first millennium is known as Standard Babylonian; cuneiform texts were written as late as the first century C.E. In addition, during the second millennium, Sumerian and Akkadian cuneiform texts were produced at various times in various areas peripheral to Mesopotamia, in an arc stretching from southwestern Iran up to Anatolia and down through Syria and the Levant into Egypt. The few cuneiform texts from southern Mesopotamia written in Semitic before 2350, in a dialect that was probably a precursor to Old Akkadian—and the many thousands from Ebla in Syria, representing a language related to, but probably different from, the precursor of Old Akkadian (Gelb 1987)—is not considered here.

Sumerian and Akkadian are not only dead languages, but unlike Sanskrit, Biblical Hebrew, ancient Greek, or Latin, they are languages without a continuous tradition of study. Akkadian is a Semitic language, but Sumerian is a language isolate of a very different type, and with a very different phonemic inventory. The values we give to cuneiform signs in Sumerian texts are based on Akkadian values and on ancient glosses. Since most of these glosses date from periods when Sumerian was no longer spoken, i.e. from a milieu speaking Akkadian or other Semitic languages, it is said that we view Sumerian phonology through Akkadian glasses. However, since the signs used to write Akkadian had been adapted from an originally Sumerian system of cuneiform writing, we might also say that our Akkadian glasses were made by a Sumerian optician.

Cuneiform writing

Cuneiform characters, commonly called *signs*, are configurations of impressions made by a reed stylus on wet clay. The earliest signs (3100 B.C.E.) were linear—that is, they were *drawn* with a pointed stylus—but it was quickly realized that *impressing* the stylus in short, quick strokes was both more efficient and more esthetic. The strokes making up a single sign are varied in length and impressed at various angles. Each stroke has a wedge-shaped head, formed by the angular head of the stylus, and a straight tail. Short angular strokes lost their tails by the end of the third millennium; and by the same time, scribes abandoned the practice of using a separate stylus with a round cross-section (or the butt-end of the normal stylus?) to write numbers (SECTION 67). The native terms for ‘cuneiform’ refer to impression of the stroke (Sumerian *gu-sum* = Akkadian *milyistu/mihiltu*) or the appearance of the stroke (Sumerian *santak* = Akkadian *santakku*). In a Sumerian epic text that includes an etiology of writing (Vanstiphout 1989), the purported first recipient of a cuneiform message exclaims, “It’s wedge-like!”

Clay cuneiform tablets vary in size from 2 × 2 cm to 30 × 30 cm, and their shapes (round, rounded corners, sharp corners, relatively thick or thin) and orientation (“portrait” or “landscape”) have varied both diachronically and synchronically (according to text type and function). Because of the effect of gravity on the wet clay, the obverse of an inscribed tablet will be flat (it sits on a flat surface while the reverse is being written and/or while drying), and the reverse slightly convex. Tablets could be fired in a kiln for enhanced durability, but this was normally done only in special circumstances, as in the case of the beautifully written exemplars in the library of Ashurbanipal (king of Assyria, 668–627); many more tablets were unintentionally baked when conflagrations destroyed their storage places in antiquity. For commemorative purposes, clay cones, prisms, cylinders, pots, and bricks were also inscribed. These last were also stamped by the thousands with ceramic or wooden stamps that had the entire text of a short inscription carved in reverse.

It is clear from the pictographic signs in the first column of TABLE 3.1 that the original orientation of writing had been 90° clockwise from the position that the cuneiform signs classically assumed. The shift in orientation is generally supposed to have to do with a change in the way the tablet was held, probably for ergonomic reasons. The time of the shift is a matter of controversy; it quite possibly had occurred by the middle of the third millennium, most certainly by the beginning of the second, although the original orientation was maintained on stone stelae until the middle of the second millennium.

From the archaic stage onward, signs were grouped into boxes called *cases*, and these could be arranged in vertical columns (in the “classical” orientation); cases were read from top to bottom, and the columns from left to right (see FIGURE 3 on page 44). By the middle of the third millennium, tablets were turned over vertically, and the reverse was inscribed in columns beginning on the right, so that the last (right-

TABLE 3.1: The Formation and Evolution of Cuneiform Signs

		Archaic Uruk ca. 3000	Presargonic Lagash, ca. 2400	Neo-Assyrian ca. 700
1	SAG			
2	KA			
3	GU ₇			
4	EME			
5	DU			
6	UDU			
7	UD ₃			
8	GUD			
9	GEME ₂			
10	GI			
11	SAR			

most) column of the obverse bordered the same edge of the tablet as the first column of the reverse. A writer or reader finishing the obverse turned the tablet and continued writing or reading in a column contiguous to the one just finished. Within cases, signs could be arranged randomly, but after the mid third millennium, they were written in the order in which they were read. Over time, the cases broadened into lines of signs, and the columns necessarily broadened as well, so that in later periods texts would rarely have more than three columns per side, whereas in earlier periods some tablets have up to fifteen columns per side. In the second and first millennia, the majority of tablets have just one column per side, representing a single transaction, a letter, or an extract of a literary text.

The only medium other than clay suitable for cuneiform writing was wax, and wax-covered writing boards—made usually of wood, but also of ivory or other precious materials—which could be hinged together to form polyptychs, are attested in texts from the end of the third millennium onward. A set of writing boards has been found in a late second millennium shipwreck off the Turkish coast, but it is impossible to determine whether they had been inscribed with cuneiform or some other script (Symington 1991). Although they were used in large numbers in first-millennium Mesopotamia, only one complete writing board in ivory, and fragments of others in ivory and wood, have been found at the Assyrian royal city Kalakh (modern Nimrud). The cover of the ivory board identified it as a copy of an astrological text intended for the palace of Sargon II (721–705), and fragments of the wax surface found with it were indeed inscribed with that very text.

Other media were used only for commemorative, decorative, or legal purposes. Cuneiform signs were laboriously incised on stone from early in the third millennium onward, on objects ranging in size from tiny cylinder seals to tall stelae (e.g. the Code of Hammurabi) to the walls of Assyrian palaces. Cuneiform was also worked in metal and wood, and painted on a variety of surfaces. Except in the early periods, the distinctive wedge shape of the strokes was painstakingly imitated in these other media.

The cuneiform signs themselves underwent great change over time, and show significant regional variation as well. (The cuneiform typeface used in this book is based on the sign forms found on tablets from the time of Ashurbanipal. Compare the illustrations throughout this section with the sometimes very different forms printed in the figure legends and the text samples.) An experienced cuneiformist can roughly date and localize a tablet by its paleography alone. The major trends in the evolution of cuneiform signs, as can be seen from TABLE 3.1, are the straightening of curved lines, the broadening of the head of each stroke, the diminution in the number of strokes per sign, the restriction of the possible orientation of the strokes, the replacement of angled strokes by horizontals, and, in Assyria, the resolution of certain groups of angular wedges into groups of parallel horizontals. As a result, almost all pictorial content disappears after the archaic stage. The number of signs diminished by about one half: in the earliest repertoire, there were around 1200 signs, counting compounds and significant variants; the number drops to 800 or less by the middle of the third millennium, and in the second and first millennia there were about 600 signs. Even though many signs in the early repertoires disappeared and others merged, new signs and sign combinations continued to be created, and some older signs even split into distinctive shapes for different meanings. The native names for the signs, attested in the second and first millennia, derive from a Sumerian or Akkadian value of a sign, or, in the case of compound, complex, and altered signs, describe the way a sign has been composed or altered.

Cuneiform signs

TABLE 3.1 reveals the pictographic basis of cuneiform, which in C. S. Peirce's terminology was both *iconic* (a head used to write the word "head" [3.1.1]) and *indexical* (a bull's head to write "bull" [3.1.8], a foot used to write "to go" and "to stand" [3.1.5]; the latter type of index is also called *semantic association* herein). But there were also a number of purely symbolic signs, such as the cross in a circle for "sheep," and other related signs for gendered and age-graded categories of sheep and goats (3.1.6–7). Possibly because drawing or impressing the stylus on clay did not lend itself to detailed representation without sacrificing the rapidity necessary for the writing system to be a useful administrative tool, the vast majority of signs are quite schematic even in their earliest versions, and the specific basis of many that are clearly intended to be representations of something remains obscure.

Using around 300 basic signs, and even fewer discrete elements, the archaic scribes elaborated a system of over 1,000 signs that was capable of representing the vocabulary necessary for recording bureaucratic transactions, including personal and place names. New signs were created by altering and combining these basic signs. Conventions for altering signs included adding lines or hatching, inversion, writing the sign at an angle, writing multiples of the sign, and making a cross of the sign and its duplicate. *Compound* signs were formed by writing one sign joined or very close to another; *complex* signs by putting one sign inside another. Many of the archaic compounds became complex signs in later periods.

Thus, the SAG sign* (TABLE 3.1.1), a pictogram of a head (Sum. *sag* 'head'), had some lines added where the mouth would be to create the sign for Sum. *ka* 'mouth' (3.1.2; used as well to write Sum. *zú* 'tooth', *kir*₄ 'nose', *nim* 'word', *gù* 'voice, sound', and *dug*₄ 'to say'). The sign for 'food' (Sum. *ninda*) was adjoined to SAG to create the sign for Sum. *gu*₇ 'to eat' (3.1.3); in subsequent periods, the sign GU₇ was built on KA, and the food moved inside, becoming a complex sign (KAXNINDA) rather than a compound one (SAG+NINDA). The sign for 'woman', a pubic triangle, is joined to the sign for 'mountains, foreign lands' to form a compound for Sum. *geme*₂ 'female slave' (3.1.9) because slaves were obtained in raids on foreign lands in the mountainous northeast. All these modifications and combinations are based on semantic association; after the archaic period, combinations that join phonetic to semantic elements were created, such as KAXME = Sum. *eme* 'tongue' (3.1.4), or $\text{𒌦} \text{𒌦} \text{𒌦}$ PA.TE.SI = *ensi*₂ 'ruler'.

This last example illustrates an important tendency in matching the repertoire of signs to the lexicon. Rather than creating ever more compound, complex, and altered

*The Assyriological convention is to refer to a sign by one of its common values written in small capitals. Actual Sumerian and Akkadian words are in *italics* (or, Sumerian is presented in spaced roman type). The components of compound signs are joined by +, those of complex signs by x; individual signs in clusters are separated by periods. Homophones are distinguished by subscript index numbers, except that on monosyllables ₂ is replaced by an acute accent and ₃ by a grave accent. Signs making up a single word are joined by hyphens.

signs, clusters of two or more signs (selected on a semantic, or, less frequently, semantic plus phonetic, basis) were written serially and read as a single Sumerian word. This prevented what would have otherwise been an enormous inflation in the number of signs as the application of writing was extended to various and different contexts.

Rebus writing, too, made it possible to represent a large number of lexemes with a relatively small number of signs, and was a way of representing lexemes that could not be easily indicated by iconic or indexical signs. Sumerian has a large number of homonyms and near homonyms—so many, in fact, that scholars have assumed that Sumerian must have been a tone language. It was thus particularly well suited for rebus substitution. Curiously, the principle of rebus writing was understood in the archaic period but hardly used. Examples include 𒂗𒂗 BA, probably a pictogram of a tool called *ba* in Sumerian, used to mean ‘to distribute’, also *ba*, and 𒂗𒂗 GI (TABLE 3.1.10), a pictogram of a reed (Sum. *gi*), used to represent *gi* ‘to render’ and in the archaic period probably also used for *sigi* ‘yellow’. Massive exploitation of rebus writing quickly developed in subsequent periods. A very few examples (giving the Sumerian word, the meaning represented originally by the sign, and the homonym represented by rebus extension): 𒂗𒂗 *su* ‘body’ and ‘to replace’, 𒂗𒂗 *si* ‘horn’ and ‘to fill’, 𒂗𒂗 *e* ‘dike’ and ‘to speak’, 𒂗𒂗 *sar* ‘plant’ and ‘to write’ (3.1.11). Rebus *phoneticism*—that is, the use of a sign to represent not a homonym of the word represented by the sign, but only the sound of that word in order to write phonetically—also seems to have been understood in the archaic period, but again is very rare. Consider archaic 𒂗𒂗 NE+RU *erim*, ‘evil’, and later 𒂗𒂗 ha-la ‘share’ or 𒂗𒂗 ba-al ‘to dig’. NE.RU is probably an attempt to render the sound [erim]; in each case, the semantic values of the individual signs have nothing to do with the meanings of the words.

The mixture of semantic association and rebus writing resulted in a very inconsistent system of representation. Whereas 𒂗𒂗 SU represents the homonyms ‘body’ and ‘to replace’, to represent *sù(d)* ‘distant’ the sign for semantically associated *gid* ‘long’ was altered with additional strokes and the resulting sign 𒂗𒂗 SUD was used as well for *sù(g)* ‘empty, naked’, based on both semantic association and rebus, and for *sù* ‘to sprinkle’, based on rebus alone. The word for ‘beard’, *su₆*, is written KA×SA, a complex sign combining semantic association (𒂗𒂗 ka = ‘mouth’) and a rebus phonetic indicator (𒂗𒂗 SA). Although rebus writing was employed with increasing frequency after about 2900, the majority of compound and complex signs and sign clusters are semantically based, without any phonetic reading clue. Consider the long and certainly post-archaic 𒂗𒂗 𒂗𒂗 𒂗𒂗 KI.SU.LU.ÚB.GAR (‘place where the water bag is put?’) *ugnim* ‘army’, or 𒂗𒂗 𒂗𒂗 𒂗𒂗 𒂗𒂗 KI.SI.GA (‘put together grass?’) *gùd* ‘nest’.

Sumerian homonymy and the primacy of semantic association in the mapping of the lexicon onto the sign system are responsible for the notorious homophony and polyphony of cuneiform signs, features that complicated the initial decipherment and were the source of considerable resistance to the decipherment once it was accom-

plished. Over twenty different signs can be read /du/, and the sign 𒂗𒂗 KA has several times the half-dozen readings mentioned above.

Sumerian cuneiform

The transformation of a writing system that used language strictly as an administrative tool into one that could adequately express natural language in a broad range of contexts—letters, commemorative inscriptions, legal documents, literary texts, technical literature—was effected by the increasing use of rebus phoneticism to write grammatical affixes. Sumerian is an agglutinative language in which nouns take suffixes and verbs both prefixes and suffixes. Virtually no trace of these affixes can be found in the early archaic texts, but they begin appearing after 2900 B.C.E. Curiously, they are used in what can only be described as a skeletal way for centuries; and only in the early second millennium, when Sumerian was probably extinct and spoken only in the schools, are the affixes fully expressed. The example in FIGURE 3 comes from a collection of sayings preserved in manuscripts from ca. 2500 and ca. 1800 (Alster 1974). The cuneiform signs added by the later version to express the affixes are here shown in smaller type.

The earlier version, using what is sometimes referred to as *nuclear writing*, omits the genitive and dative suffixes of the nominal complex, as well as the verbal prefix, root reduplication (for imperfective), and second person singular suffix of the verb. Note that the genitive suffix *-a(k)* is written *-ra* after *engar* ‘farmer’, illustrating the regular convention of using a CV sign to write a vocalic suffix after a consonant, which helps (along with contextual features) to disambiguate the sign APIN, which could be read *apin* ‘plow’ or *uru₄* ‘to cultivate’ in addition to *engar* ‘farmer’. (How and to what extent the grammatical affixes expressed in written Sumerian found phonological expression in Sumerian is a vexing problem that cannot be broached here.)

Sumerian cuneiform, then, is what Gelb (1963) termed a logosyllabic writing system. Unbound morphemes are represented by logograms (single signs or sign clusters); bound morphemes are expressed by rebus-derived syllabograms, usually V, CV, or VC (but note 𒂗𒂗 NAM in FIGURE 3, late version). In addition, beginning in the archaic period Sumerian texts employ a series of semantic classifiers called *determinatives* that had no phonological realization and were probably developed to help disambiguate polyvalent signs. Some precede and some follow the word they determine, and in transliterations they are generally written as superscripts, for which propose the very common determinatives 𒂗𒂗 AN for *dingir* ‘god’, 𒂗𒂗 DIŠ preceding a male personal name, and 𒂗𒂗 SAL for *munus* ‘woman’ preceding a female name are abbreviated ^d, ^m, and ^f respectively. Thus, in the sample passage below, 𒂗𒂗 𒂗𒂗 𒂗𒂗 *kul-ab₄ki* is the city Kulab followed by the determinative *ki* ‘place’, and 𒂗𒂗 𒂗𒂗 *utu* is Utu, the sun god, preceded by the determinative *dingir* ‘god’.

In literary texts, lines are generally complete clauses; and in archival texts, a line constitutes a single entry. When a clause or entry doesn’t fit on a single line, it is con-

tinued, indented, just beneath, before a new line is begun at the column's left edge. If space permits, words or phrases may be grouped together; if there is too much space, the last sign or two are moved to the right, even though it breaks up the word, so that the last sign on the line is at the line's right edge. In no instance, at least after the middle of the third millennium, are words split between two lines.

SAMPLE OF SUMERIAN

1. Sumerian:

2. Transliteration:

3. Gloss:
1. 2. 3.

1. 2. 3.

1. 2. 3.
- kin-gi₄-a messenger mouth-his heavy AUC

nu-mu-un-da-an-gi₄-gi₄ en kul-ab₄-a-ke₄ Kulab-DET-of-ERG im-e clay-on šu hand

bi-in-ra dub-gim tablet-like PREF-he-struck u₄-bi-ta day-that-from inim word PREF-he-put clay-on put not-that-from-existed-COP

‘The messenger’s mouth was heavy, he could not repeat the message. The Lord of Kulab patted some clay, he put the words on it as on a tablet. Before that time, words put on clay had never existed.’
— From manuscript of ca. 1800 B.C.E. of the Sumerian tale “Enmerkar and the Lord of Aratta” (Vansiphout 1989).

Akkadian cuneiform

The Old Akkadian syllabary (Gelb 1961) developed ca. 2350 B.C.E. based on the same principle of rebus-based syllabic writing used to express grammatical affixes in Sumerian cuneiform, which had been used as well to write Semitic and other non-Sumerian names for centuries. Many of the same syllabic signs were used, and many more were added, based either on Sumerian values or on the Akkadian translation of the Sumerian meaning of a sign.[†] For example, KAL = /dan/ because that sign was used to write Sumerian *kalg* ‘strong’, which is *dannu* in Akkadian; or GIŠ = /is, iṣ, iz/ because Sumerian *giš* ‘tree’ = Akkadian *iṣu*. Most of the signs chosen represent open syllables (V, CV, VC); but CVC signs were also used from the beginning, constituting from five to fifty percent or more of the syllabary, depending on period,

[†]In transcribing Akkadian, a macron indicates a historically long vowel or length compensating for loss of a consonant, and a circumflex indicates a long vowel derived via contraction of vowels. Logograms are transliterated in small capitals; in a transcription, logographic vs. syllabic writing is not indicated.

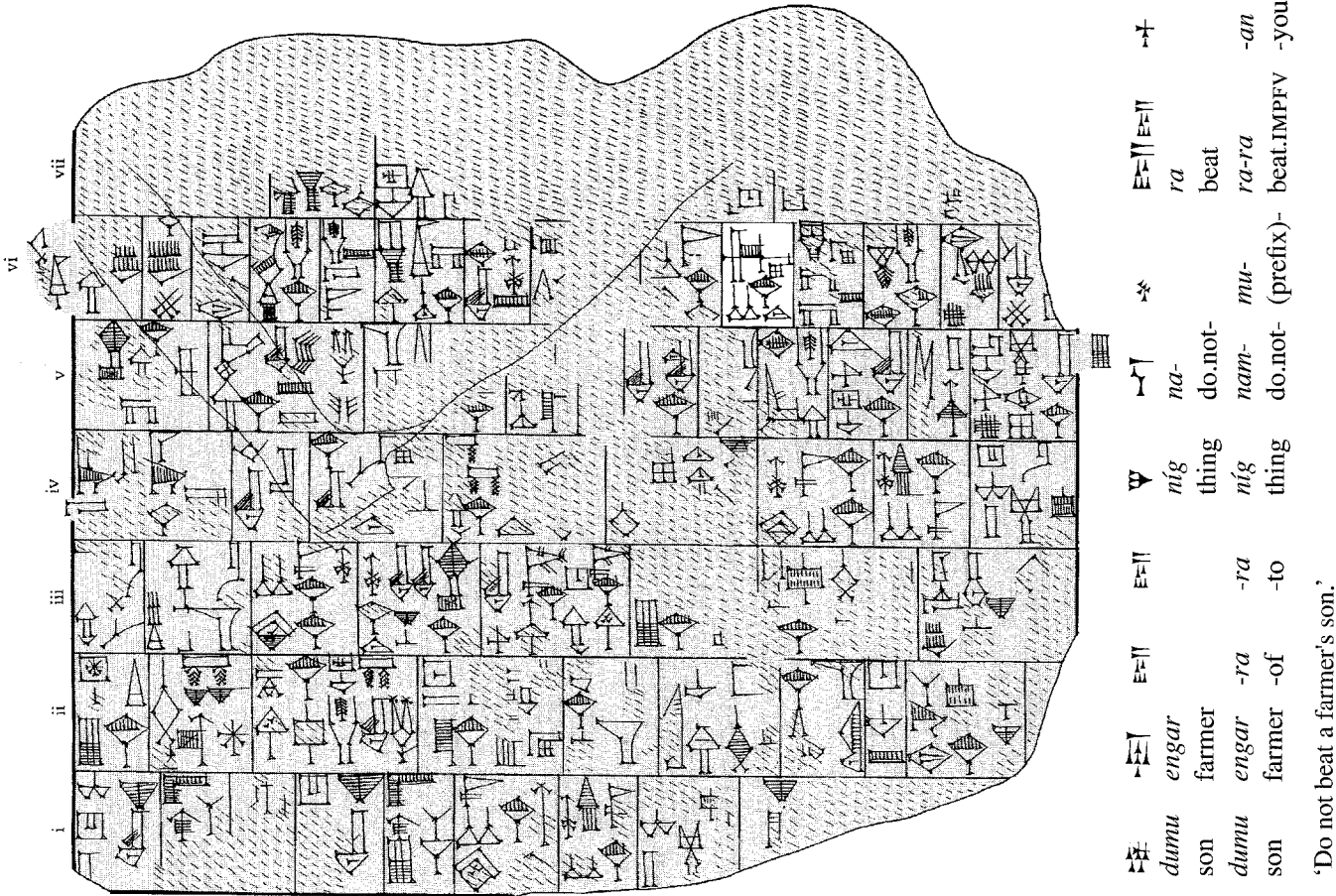


FIGURE 3. Copy of cuneiform tablet with early version of saying. The example quoted is the fifth-from-bottom case in column vi (Biggs 1974, no. 256).

place, and the kind of text being written. (For the question of CVCV signs, see Reiner 1973.) In addition to syllabic orthography, Akkadian writing can also use signs with their Sumerian lexical values as logograms; e.g. the sign  LUGAL (Sumerian *lugal* 'king') would be read as the contextually appropriate allomorph of Akkadian *šarru* 'king'. But Akkadian cuneiform writing was from the beginning primarily syllabic—no doubt because as an inflecting language, Akkadian was ill suited to the kind of logossyllabic writing used for Sumerian. (Sumerian-style logossyllabic writing was in fact tried on a Semitic language at Ebla and other northwestern sites, but was later abandoned in favor of the syllabic writing developed for Old Akkadian.)

INVENTORY. In the Old Akkadian syllabary, the phonological features voiced, voiceless, and "emphatic" are not distinguished at all. Only one CV sign each is used to represent a labial, dental, or velar stop followed by a given vowel. Either this was a way to hold down the number of signs in the syllabary, or the actual phonological basis of the distinction made between the Sumerian stops that we transcribe as voiced vs. voiceless (*b, d, g* vs. *p, t, k*) was heard differently than the distinction made between Akkadian voiced, voiceless, and emphatic stops (represented as *b-p* [no emphatic labial], *d-t*, and *g-k-q*). So for example,  DA = /da/, ta, /ta/,  DI = /di/, ti,  GA = /ga/, ka, /ka/,  BU = /bu/, pu. By the early second millennium, when Sumerian was no longer spoken outside the schools, scribes began to use the signs for distinct Sumerian stops to represent voiced and voiceless syllable-initial Akkadian stops, in what appears to be a reinterpretation of the stop system of the now dead Sumerian language in terms of the system of Akkadian. The emphatic series was represented by the voiced or voiceless sign ( DA = /da/, ta, /ta/,  KI = /ki/, qi/), or else emphatic values were given to separate signs (e.g.  TUN = /tu/,  GUM = /qu/;  HI = /ta/ because HI was used to write Sumerian DUG 'good', which is *tābu* in Akkadian). The tendency over time is to increasingly distinguish stops in CV signs, but in no period was this done consistently. The representation of sibilants developed similarly, though it was very much more complicated at the beginning because Old Akkadian preserved more sibilants than later stages of the language and tried to distinguish among them (see Gelb 1961 for the problem of Old Akkadian sibilants, labryngeals, and pharyngeals).

In syllable-final position, Sumerian never distinguished between voiced and voiceless stops (probably only voiced stops were allowed in that position), and Akkadian writing never makes that distinction either. In all periods,  AD = /ad/, at, /at/, etc. (similarly, in the sibilants,  UZ = /uz/, us, /us/, etc.). In CVC signs, the initial stop may be distinguished ( DIR = /dir/,  GIR = /gir/), but  TIR = /tir/), but never final stops ( DAG = /dag/, dak, /daq/).

As in Sumerian writing, the Akkadian syllabary generally distinguishes three primary vowels, /a, i, u/, and distinguishes a fourth vowel /e/ (see Reiner 1973) in some signs, but usually the signs incorporating the /i/ vowel are used for /e/ as well (e.g. the pairs /id, ed/, /gir, ger/, etc. are written with one sign each). Exceptions occur with

weak consonants and glides:  RI can be used to represent /w/ + any vowel, or any vowel + /w/—and also, in some syllabaries, /y/ + any vowel, or any vowel + /y/ (which in other syllabaries is represented by  I+A).  AH = any vowel + /h/, and in earlier periods ' + any vowel; in later periods a separate sign derived from AH,  V, is used for ' + any vowel, or any vowel + '. In some CVC signs, too, the V can represent more than one primary vowel; thus, for different reasons in each case,  HAR = /har, /hir, /hur/,  NIM = /nim, num/, and  LU = /dib, dab/.

With rare exceptions in certain syllabaries, there is one sign each for the vowels /a, e, i/ and three for /u/. In Old Akkadian,  U = /yu/,  U = /u/, and  U = /ʔu/; in the early second millennium, u dropped out of the syllabary,  U was used for /u/, and  U was specialized to write the conjunction u 'and'. In the first millennium,  U and  U retain those same functions, but u returns as an alternate for either.

In theory, Akkadian could be written perfectly well with a concise set of V, CV, and VC signs, since the digraph CV-VC is equivalent in the system to CVC. Yet CVC signs were in the Akkadian syllabary from the beginning, probably because of the association of the signs with Sumerian CVC readings; and their number and use increase over time. But even the latest periods do not have CVC signs for every possible syllable: for example, from Old Akkadian onward, CVC signs can be used to write /dan/ or /maš/, but there are never CVC signs to write /lan/ or /baš/. There is a small amount of homophony in the early Akkadian syllabaries, but the choice of homophones is seldom free; it is, rather, contextually determined. In Old Akkadian,  NE = /bi/ when it is etymologically /biʔ/. At Mari,  AB is commonly used with the value *is* to write /is/; but in a sequence /iss V/, if /ss/ is etymologically **ns*, then /is/ is written with  GIŠ = *is*. Only after the middle of the second millennium, and especially in the first, do we find cases of free variation (though still, often, with a degree of predictability) of values like  AD and  PU, and even CVC signs like  DUB and  DUB. Similarly, although a small amount of polyphony exists in the early syllabaries, it is only in the first millennium that it becomes rampant.  KUR can be read *mad, nat, lad, šad, sad, kur*;  UR is *ur, lik, tən, taš/s, tīs*;  SAL is *s/šal, rag, mim, mám*, and so on. Whereas a scholar at the court of Ashurbanipal would have mastered ca. 600 cuneiform signs with their syllabic and/or logographic values (as well as hundreds more compound logograms), scribes writing Akkadian in most periods had a working repertoire of between two and three hundred signs, and a scribe or merchant in an Old Assyrian trading firm (ca. 1800 B.C.E.) could do very well with around one hundred syllabic signs and a handful of logograms.

TABLE 3.2 presents a cuneiform syllabary of the first millennium, known as Syllabary A (edited by Richard T. Hallock, in Landsberger 1955: 1–45; cf. Cavigneaux 1983). This would have been the first list of signs and their values for a student scribe to master in Nineveh during the age of Ashurbanipal. It is presented in the order of the original manuscripts, and the values are supplied with accents and index numbers according to modern scholarly conventions. Only the values given in the syllabary are listed here (with some minor adjustments). Where the sign values have not been pre-

served on the ancient manuscripts, they have been restored. In the manuscripts, the values are expressed using a very limited inventory of CV and VC signs; these are gathered in TABLE 3.4 on page 57, which will also serve as a phonetic key to the cuneiform syllabary and to the subsequent tables.

As set forth above (page 46), all syllable-final stops and sibilants (except /š/) can be used for voiced, voiceless, or emphatic segments (thus sign 3 could be used to write /šug, šuk, šuq/), but in syllable-initial position this is not necessarily the case (sign 2 is /sur/ but never /zur, šur/, for which see sign 82; sign 22 is /za, ša/ but rarely /sa/, which is usually written with sign 108). Note that this ancient beginners' syllabary does not always give all the current values of each sign it lists, and there are some relatively common signs that it entirely omits (TABLE 3.3 on page 52). A few signs appear in two different places in the list, because the sign current in seventh-century Assyria represented two or more earlier signs whose forms had coalesced.

Syllabary A begins with the sign A because a different beginners' syllabary, used a thousand years earlier, also began with A. The succession of signs is determined by phonetic, graphic, and semantic factors, but not all transitions are explicable. Thus, sign 2 SUR follows A possibly because Sumerian *a* is 'water' and *sur* is 'to press out, drip liquid'. Sign 3 is graphically similar to sign 2, and sign 4 was attracted because of the rhyme of /mur/ and /sur/ (no. 2). Signs 5 and 6 are graphically related to 4, sign 7 was attracted because /hu/ is the inverse of no. 5 /uh/, and sign 8 is formed by adding a single vertical wedge to sign 7. Cavigneaux stresses that not only Sumerian meanings come into play (signs 9 and 10 are both third person singular suffixes), but the phonetic similarities of the Akkadian equivalents of the signs can be relevant as well (166–168: GEME₂ = *amitu*, AMA = *ummu*, EŠ = *amitu*).

TABLE 3.3 lists some common signs that were not included in Syllabary A by the ancients. The list is adapted from Landsberger 1955: 45, with the most frequent values added using the same typographic scheme as TABLE 3.2.

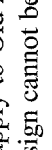
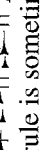
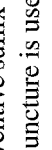
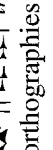
ORTHOGRAPHY. Rules of Akkadian orthography vary chronologically and geographically; the following represents standard practices and trends that do not (necessarily) apply to Old Akkadian or late Akkadian dialects. Within a word, a consonant-final sign cannot be followed by a vowel-initial sign: *parāsu* 'to decide' would be written . This rule is sometimes violated at a morpheme boundary: *iprusam* < *iprus* 'he decided' + ventive suffix *-am* may be written . Otherwise, the C-V juncture is used to indicate a glottal stop: *im'idu* 'they have become many' is written . Double consonants may or may not be expressed, but in most orthographies a double consonant can only be written if grammatically justified. Similarly, long vowels may or may not be indicated (by adding the appropriate V sign after a CV sign), but are usually grammatically justified when written, and are almost always expressed in word-final position when derived from the contraction of etymologically dissimilar consonants. Thus  *ka-lu* can be either *kallu* 'bowl' or

TABLE 3.2: Syllabary A^a (continued)

1		a	36		gán
2		sur	37		en
3		šug	38		in
4		mur, har, KIKKIN	39		eti
5		uh	40		el, SIKIL
6		i', UMUN ₄	41		ši, lim, LIB ₄ , BAD ₃ , igi
7		hu, u ₁₁ , pag, MUŠEN	42		IGI ₂
8		ri, dal	43		bi, tí, šár, DÜG
9		bi, kaš	44		DU ₁₅ , kam
10		ni, zal, li	45		an, il, DINGIR, SA ₈
11		bu, sir	46		BULUḪ, ḫal
12		sù	47		ur, lik, taš
13		ku, šà, zì, dūr, tukul	48		ne, dè, bí, bil, kúm, šaḫ, IZI
14		lu, dīb, UDU	49		GIBIL
15		ru, šub, GEŠPU	50		ka, pí ₁₀ , INIM, DU ₁₁ , ZÚ, KIR ₄
16		ḫa, a-, ku ₆	51		sag
17		kir, peš	52		súr
18		li	53		du, ša ₄ , rá, gub
19		la	54		SUḪ ₆
20		lum	55		KAŠ ₄
21		zu	56		i
22		za	56A		ya
23		su, kuš	57		šu
24		nu	58		ša
25		na	59		ša
26		ba	60		uḫ
27		zi	61		aš, rā, dil
28		ge	62		ERIM, zab
29		ge ₄	63		u ₄ , ud, tam, par, lab, ZALAG
30		gim, dim	64		ad
31		ma	65		da
32		mu	66		ta
33		taḫ	67		ti
34		iz, giš	68		um
35		gá, MÀ, mal, PISAN	69		dub

a. Values transcribed in lower-case roman would have been used both for syllabic Akkadian writing and logographically; italicized values would have been used only in syllabic writing, and values in small capitals are only logograms or hypothetical values that are never found in context. Cf. FIGURE 9 on page 147.
b. Compare no. 200.
c. Compare no. 91.

TABLE 3.2: Syllabary A^a (continued)

70	𐎶	mes	106	𐎶	di, sá, šim
71	M98	urudu	107	𐎶𐎶	šar, mú, NIŠA, NISI
72	𐎶𐎶	am	108	𐎶𐎶	sa
73	𐎶𐎶	im	109	𐎶𐎶	bir, sim, nam
74	𐎶𐎶	iš, mil, SAḤAR	110	𐎶𐎶	ab, eš
75	𐎶𐎶	gal	111	𐎶𐎶	GU, GUD
76	𐎶𐎶	nun	112	𐎶𐎶	ul
77	𐎶𐎶	me	113	𐎶𐎶	az
78	𐎶𐎶	mi, šil, gíg	114	𐎶𐎶	ug, PIRIG ₃
79	𐎶𐎶	dugud	115	𐎶𐎶	ANŠE ₂ , ħÚŠ, PIRIG, ĠIR
80	𐎶𐎶	din	116	𐎶𐎶	ALIM
81	𐎶𐎶	GEŠTIN	117	𐎶𐎶	ħuš
82	𐎶𐎶	zur, AMAR	118	𐎶𐎶	kiš
83	𐎶𐎶	siskur	119	𐎶𐎶	ANŠE
84	𐎶𐎶	uz	120	𐎶𐎶	lib, paḫ, nar
85	𐎶𐎶	KU, tu, ħUDUŠ	121	𐎶𐎶	NAGAR
86	𐎶𐎶	tum, ĩb	122	𐎶𐎶	gur
87	𐎶𐎶	egir	123	𐎶𐎶	gār
88	𐎶𐎶	din	124	𐎶𐎶	dar
89	𐎶𐎶	mar	125	𐎶𐎶	ríg, šum
90	𐎶𐎶	rad	126	𐎶𐎶	ŠA ₃ , qu, gum
91	𐎶𐎶	dib	127	𐎶𐎶	gaz
92	𐎶𐎶	ħab, ħir, rim, LAGAB	128	𐎶𐎶	ÁG
93	𐎶𐎶	tab	129	𐎶𐎶	kúr, pap
94	𐎶𐎶	kas	130	𐎶𐎶	bur
95	𐎶𐎶	laḫ, SUKKAL	131	𐎶𐎶	bar
96	𐎶𐎶	dan, kal, lib, GURUŠ	132	𐎶𐎶	si
97	𐎶𐎶	gu	133	𐎶𐎶	SI ₄
98	𐎶𐎶	ga	134	𐎶𐎶	pa
99	𐎶𐎶	ub, ár	135	𐎶𐎶	u
100	𐎶𐎶	lam	136	𐎶𐎶	ù
101	𐎶𐎶	pi, me ₃ , à, tál, GELTAN	137	𐎶𐎶	maš
102	𐎶𐎶	dù, rú, gag	138	𐎶𐎶	šá, gar, MU ₃ , NINDA, NITA ₄
103	𐎶𐎶	ir	139	𐎶𐎶	al
104	𐎶𐎶	ra	140	𐎶𐎶	il
105	𐎶𐎶	ki	141	𐎶𐎶	ú

d. Repeated from no. 14, because originally different sign.
e. Compare no. 137.
f. Sign originally different from no. 131.

TABLE 3.2: Syllabary A^a (continued)

142	𐎶	lál	177	𐎶𐎶	un, KALAM
143	𐎶𐎶	lál	178	𐎶𐎶	gú
144	𐎶𐎶	id	179	𐎶𐎶	dur
145	𐎶𐎶	š	180	𐎶𐎶	sig
146	𐎶𐎶	SIMUG	181	𐎶𐎶	SIG ₃
147	𐎶𐎶	uš, ús, nit, NITA, Ġiš	182	𐎶𐎶	te, TEMEN
148	𐎶𐎶	KU ₇	183	𐎶𐎶	kar
149	𐎶𐎶	sì	184	𐎶𐎶	bal
150	𐎶𐎶	KI ₄ , saḫ, lál, kid	185	𐎶𐎶	šul
151	𐎶𐎶	bar ₄ , dàg	186	𐎶𐎶	šah
152	𐎶𐎶	e, ÉG	187	𐎶𐎶	lú
153	𐎶𐎶	é	188	𐎶𐎶	LUGAL, šartu
154	𐎶𐎶	BUR ₆ , LEL ₄ , KISAL	189	𐎶𐎶	maḫ
155	𐎶𐎶	ká	190	𐎶𐎶	ħul
156	𐎶𐎶	ar	191	𐎶𐎶	gul
157	𐎶𐎶	muš, šir	192	𐎶𐎶	áš, zíz
158	𐎶𐎶	úr	193	𐎶𐎶	í, ĠUR
159	𐎶𐎶	sis, šeš, UR ₃	194	𐎶𐎶	gab, duḫ, DU ₈
160	𐎶𐎶	ib, URAŠ, DAR ₃	195	𐎶𐎶	NITA ₃ , ir, ARAD
161	𐎶𐎶	tag, šum	196	𐎶𐎶	ARAD ₂
162	𐎶𐎶	sal, rag, min	197	𐎶𐎶	šir, ħir, EZEN
163	𐎶𐎶	nin, min ₄ , eriš	198	𐎶𐎶	IDIM
164	𐎶𐎶	ag, ME ₆	199	𐎶𐎶	še
165	𐎶𐎶	ig, gál	200	𐎶𐎶	še
166	𐎶𐎶	GEME ₂	201	𐎶𐎶	nim, tum, ELAM
167	𐎶𐎶	AMA, DAGAL	202	𐎶𐎶	tum
168	𐎶𐎶	eš	203	𐎶𐎶	nir
169	𐎶𐎶	zib	204	𐎶𐎶	zag
170	𐎶𐎶	kur, šad, lad, mad, nad	205	𐎶𐎶	héc
171	𐎶𐎶	qa, SILA ₃	206	𐎶𐎶	kab
172	𐎶𐎶	tar, ħaš, kud, sil	207	𐎶𐎶	kib
173	𐎶𐎶	he, til, úš, bad	208	𐎶𐎶	ter
174	𐎶𐎶	kù	209	𐎶𐎶	tuk
175	𐎶𐎶	sa ₆	210	𐎶𐎶	tag
176	𐎶𐎶	BÀN, BANDA ₃ , DUMU, tur	211	𐎶𐎶	bár, šAR ₆

g. Compare no. 198.
h. Sign originally different from no. 173.
i. Sign originally different from no. 13.

to the stock of superfluous CVC signs, and making ever increasing use of Sumerian-derived logograms. Literacy in cuneiform was never to be reduced to the mastery of a syllabary and some orthographic rules; "Sumerian culture," acquired over years of study and zealously cultivated by the academics who controlled the curriculum and established the canon, was the ticket of admission to literate society. Neither efficiency nor convenience played an important role in the development of Akkadian cuneiform.

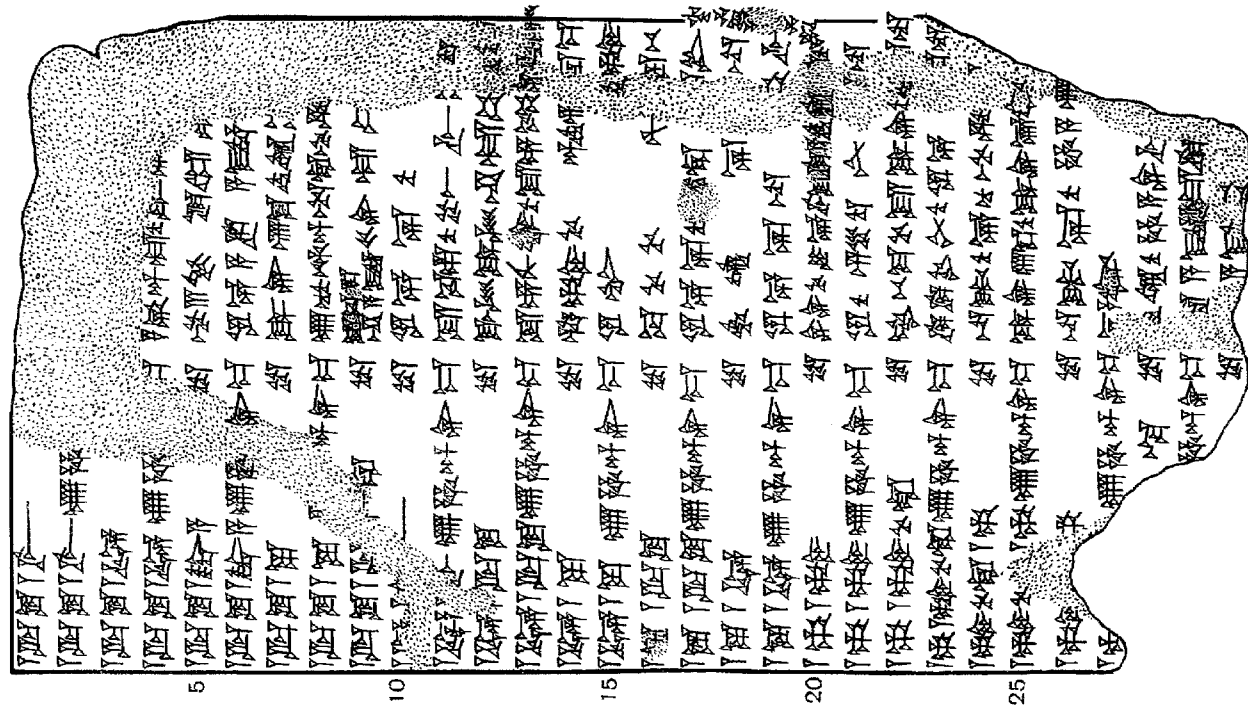
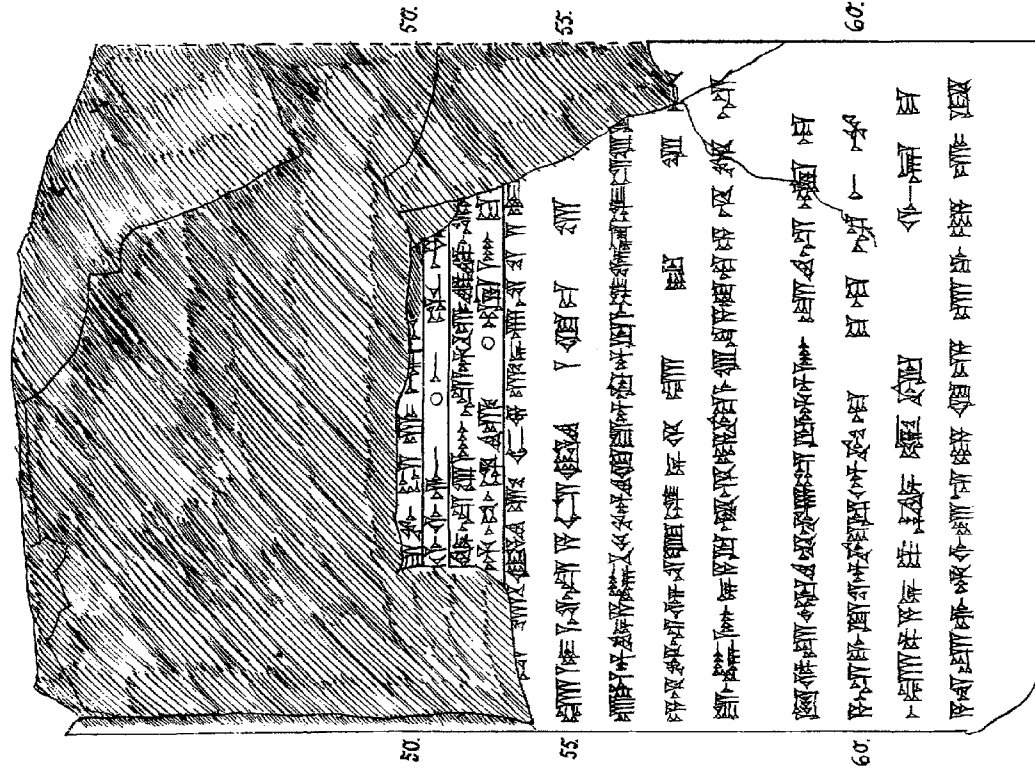
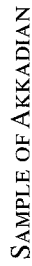


FIGURE 4. A first-millennium Akkadian omen text in Babylonian script. The omens are derived from the behavior of various animals. The initial wedge I in each line is logographic for Akkadian *šumma* 'if', which is followed by the logogram for the animal in question: I-9  UR.GH, 'dog', IO-15  SA.G, 'pig', 16-19  UDU, 'sheep', 20-23  GUD, 'ox', and 24-27  ANŠE.KUR.RA, 'horse' (Gadd 1926, pl. 26).

Other languages

GENE B. GRAGG

By the mid third millennium B.C.E., the cuneiform writing system, now adapted to both Sumerian and Akkadian, had evolved into its near-definitive inventory of some 600 mixed syllabic-logographic signs with their characteristic polyphony (most signs are associated with a set of syllabic and/or logographic values) and homophony (most syllabic and some logographic values can be represented by more than one sign). No one implementation of cuneiform used all 600-plus signs, nor all possible values of the signs it did use, and the history of cuneiform is the history of the variable selection made by different periods, places, and genres, adding some values, pruning many, with characteristic local adjustments in the ductus and complexity of the sign-forms (usually in the direction of simplification and reduction in number of possible “sign components”). As Mesopotamian institutions (including the cuneiform writing system) became normal vehicles of West Asian cultural expression, the adaptation of the cuneiform writing system took on a dimension of adjustment to new linguistic environments—sometimes for proper names (Amorite) or isolated glosses (Kassite) or texts in related Semitic languages (Eblaite, Canaanite; even a single known Aramaic incantation text), but eventually for full notation of a corpus of texts in languages completely distinct from Sumerian and Akkadian. There are four privileged cases of this adaptation: Hittite, Elamite, Hurrian, and Urartian. (A possible fifth case, involving Hattic, the non-Indo-European language of the predecessors of the Hittites in their capital Hattusha, involves too many unknowns—not the least of which is uncertainty about the reliability of the knowledge of Hattic on the part of the Hittite-speaking scribes from whom we have all our Hattic texts.)

In the tables that follow, the row labels give the probable consonant (phoneme or allophone) value in the target language, with following or preceding vowels as column labels. Each syllable in the cells is a standard transliteration value of the cuneiform sign used to represent the combination of the consonant(s) in question with the particular vowel(s)—the transliteration value which is the closest available one to the presumed target language syllable. Thus the sign $\text{E}\Pi$, which can be transliterated *zi*, is used for the Elamite syllables /zi/ and /ze/, or perhaps /či/ and /če/. Where the transliteration value is less familiar (e.g. $\text{E}\Pi$ *ka*), its usual designation is added in small capitals. Less common values are given in italics.

Elamite cuneiform

Elamite has no known linguistic affiliations (a link with Dravidian has been suggested, but never widely accepted). Spoken by the southeastern neighbors of Sumerian on the Iranian coastal plain and associated highlands, it has a history of cuneiform ex-

TABLE 3.5: Achaemenid Elamite Syllabic Signs and Values

	<i>a</i>	<i>e</i>	<i>i</i>	<i>u</i>	<i>a</i>	<i>e</i>	<i>i</i>	<i>u</i>
<i>p</i>	pa		pi	pu	ap		ip, <i>ip</i>	up
<i>b</i>	ba	be						
<i>k</i>	ka(QA)		ki	ku	ak		ik	uk
<i>g</i>			gi					
<i>t</i>	da	te	ti	tu, <i>tu</i> ₄	at			ut
<i>d</i>				du				
<i>š</i>	ša, ša	še	ši	šu	áš		iš	
<i>s</i>	sa	si		su	as/z		is/z	
<i>z</i> (=č?)	za	zi						
<i>y</i>	ya							
<i>l</i>	la	li		lu				ul
<i>m</i>	ma	me	mi	mu	am			um
<i>n</i>	na	ni		nu	an	en	in	un
<i>r</i>	ra	ri		ru			ir	ur
<i>h</i>	ha		hi	hu	ah			
Ø	a	e	i	u, <i>ú</i>				

pression, ca. 2500–331 B.C.E., almost as long as that of Akkadian. After abandoning an indigenous cuneiform-like writing system which had achieved widespread use on the Iranian plateau by the early third millennium (SECTION 10), the Elamites began using an Old Akkadian form of cuneiform to write at first Akkadian, but eventually monumental inscriptions, letters, and administrative documents in their own language. Soon after the initial adaptation, sign forms began to take on a recognizably Elamite ductus, and for texts of the final periods there are many signs that cannot be easily recognized by scholars who have not spent time working specifically in this area of cuneiform.

The Elamite adaptation of the cuneiform script is characterized by a radical reduction in the inventory of cuneiform signs. For the whole period only 206 signs are used, and in any given period (Old, Middle, Neo-, and Achaemenid) the total number of signs used remains remarkably constant—at about 130 (Stève 1992). What changes from period to period is the complexity of the syllabary and the number of logograms. In the earliest texts very few logograms are used, but almost all common syllabic CV and VC values from the Old Akkadian syllabary are taken over. In each successive period the syllabary becomes sparser, while, for unrelated reasons (probably because of the increased frequency of list-like administrative and economic texts) the number of logograms increases.

TABLE 3.5 (adapted from Paper 1955) gives the relatively compact syllabary of CV and VC signs achieved in the royal monumental inscriptions of the final period, Achaemenid Elamite (539–331 B.C.E.).

TABLE 3.6: Mitanni Hurrian Syllabic Signs and Values

	<i>a</i>	<i>e</i>	<i>i</i>	<i>o</i>	<i>u</i>	<i>a</i> ₋	<i>e</i> ₋	<i>i</i> ₋	<i>o</i> ₋	<i>u</i> ₋
<i>p ~ b, pp</i>	pa	pè	pí(ɪ)	pu		ap	e/ɪp		up	
<i>t ~ d, tt</i>	ta	te	tí	tù		at	e/it		ut	
<i>k ~ g, kk</i>	ka	ké	kí	ku	ku _g	ak	e/ik		uk	
<i>f ~ v/w, ff?</i>		wa/e/i/u(ɪ)				aw(AB)	e/iw(ɪB)		uw(UB)	
(see text)	ú-a	ú-e	ú-i	ú-u	ú-ú?	a-ú	e-ú	i-ú	u-ú	ú-ú?
<i>ts ~ dz, tsts</i>	sa	sɪ/e								
<i>s ~ z, sy</i>	sà	sé/sf		sú		as	es/is		us	
<i>š ~ ž, šš</i>	ša	še	ši	šu		aš	eš	iš	uš	
<i>x ~ ġ, xx</i>	ħa	ħé	ħi	ħu			a/e/i/uh			
<i>l, ll</i>	la	le/i		lu		al	el	il	ul	
<i>r</i>	ra	re/i		ru		ar	e/ir		ur	
<i>m, mm</i>	ma	me	mi	mu		am	e/im		um	
<i>n</i>	na	né/i		nu		an	en	in	un	
Ø	a	e	i	u	ú					

again voiceless in intervocalic geminates of the type VC-CV as in *ḥu-up-pa*. Apparently in Hurrian, then, the basic distinction in consonants is not voiced/voiceless, but geminate/non-geminate; initial consonants can only occur non-geminate and are realized as voiceless, as are intervocalic geminates, while intervocalic non-geminates are realized with a voiced allophone. This principle seems to be explicitly incorporated into the Mitanni syllabary, whose organization tends generally toward absolute minimization, if not complete elimination, of polyphony/homophony. For each vowel V and each articulatory position, only one of the possible voiced/voiceless pair of CV signs is chosen, usually the more common one. This sign was then presumably pronounced with the (redundant) voiced allophone when occurring intervocalically and non-geminate, voiceless otherwise.

For back rounded vowels, Mitanni used both 𐎶 *u* and 𐎶𐎵 $\bar{u}$, but never as variants—words and affixes are consistently spelled with one or the other; therefore they must represent two different vowels, presumably /u/ and /o/ ($\bar{u}$), which can also be used for /w/, is assigned to the former, and *u* to the latter). In the velar series, the orthography, which has chosen 𐎧𐎶 *ki* and 𐎧𐎶𐎵 *ku* for the values *ki*, *gi*, *ku*, *gu*, goes so far as to take the unassigned signs 𐎧𐎶𐎵 *gi* and 𐎧𐎶𐎵 *gu* and use them without exception for values which are clearly *ke*, *ge*, *ko*, *go* (this can be verified in instances where stem-final *g*, (*k*)*k* is followed by *e*, *o*). Note, however, that although they could have done this also for the dental series by employing the unused 𐎧𐎶𐎵 *tu*, they did not; the labial series in cuneiform in any case does not afford two signs for the values *pu*,

bu. Writings of the form CV₁-V, with “*plene*” or “redundant” writing of the vowel inherent in the CV sign, are especially abundant. Opinion is divided as to whether this is an indication of vowel length, absence of a cluster, or an attempt to make explicit vowel quality distinctions (*e* vs. *i* and *o* vs. *u*) not consistently made by the syllabary.

The Mitanni syllabary needed additional innovations in order to represent what seems to have been a voiced/voiceless labial continuant pair, probably either [f, v] or [f, w]. For these in CV signs, the Mitanni syllabary uses the sign 𐎠 —PI, which is already quasi-alphabetic with the values *wa*, *we*, *wi*, *wu* in the standard cuneiform syllabary. In view of the general avoidance of homophony, the fact that the 𐎠 AB, 𐎠 IB, 𐎠 UB series is used for this labial continuant VF may mean a genuine neutralization of the stop/continuant distinction in geminates. 𐎠 is also used with preceding or following vowel for a sequence involving a labial continuant. It is not clear how, if at all, the value of these 𐎠 writings differs from that of the PI, AB, IB, UB writings—although the tendency to avoid homophony would seem to indicate a priori that it should. Elsewhere in spirants, the 𐎠 ZA, 𐎠 ZI, 𐎠 ZU series is used for *s*, *z*, whereas the 𐎠 SA, 𐎠 SI, 𐎠 SU series seems to be used for an affricate, perhaps *ts*, *dz*. Similarly, the 𐎠 - and 𐎠 -series enable representation of š , ž and *x*, *χ*.

SAMPLE OF HURRIAN

[illegible]

have been written as early as the seventeenth century B.C.E., the bulk of the material in our possession, more than 600 compositions preserved on several thousand tablets, comes from the fifteenth through the thirteenth centuries, and was found in the various archives of the Hittite capital, Hattusha (modern Boghazköi).

The Hittite writing system uses at least 375 cuneiform signs, of which 86 are employed in the core syllabary of CV, V, and VC signs. These are given in TABLE 3.8. In addition to these values, Hittite cuneiform also took over a number of CVC values. The most recent syllabary, Rüster and Neu (1989), lists 74 signs with a total of 89 CVC values (nine of these signs also occur in TABLE 3.8 with VC and CV values). Besides the syllabic CV signs of TABLE 3.8, the scribes of Boghazköy evolved five complex CV signs made by inserting a small V sign ∇ a, ∇ e, ∇ i, ∇ u, ∇ $\dot{u}$ inside (under the horizontal of) PI , a sign which in a number of cuneiform systems could be used by itself in the values *wa*, *wi*, *we*, *wu* (compare e.g. TABLE 3.6). These signs, however (transcribed *wa_{qr}*, *we_{qr}*, *wi_{qr}*, *wu_{qr}*, *wu_{qr}*), were only used in the writing of Hurrian, Hattic, Luvian, and Palaic passages. Moreover, in Boghazköy Hurrian at least, the signs were used redundantly in a large number of their occurrences—i.e. in writings of the sort *-wa_{qr}-a-*, *-we_{qr}-e-*, etc.

Following a pattern already observed in the other adaptations of cuneiform, the Hittite writing system shows its own ambivalence about the rendering of voiced and voiceless stops. In the stop series, for a given articulatory position and vowel, the choice of a voiced or voiceless consonant value (i.e. a sign whose conventional Akkadian value is voiced or voiceless) seems to be a question of at most orthographic habit, and many words can be written with either variant: thus 𒀭𒍪𒀭𒍪 *da-ma-iš* or 𒀭𒍪𒀭𒍪 *ta-ma-iš* 'other', 𒀭𒍪𒀭𒍪 *e-eš-tu* or 𒀭𒍪𒀭𒍪 *eš-du* 'let him be', 𒀭𒍪𒀭𒍪 *gi-e-nu* 'knee (nom.sg.)' versus 𒀭𒍪𒀭𒍪 *ki-nu-wa-aš* 'knee (dat.pl.)'. Hittite does, however, show a tendency to write etymologically voiceless stops double "where the cuneiform syllabary makes this possible" (i.e. between vowels). This relationship between gemination and voicelessness is known as Sturtevant's Law; it can be seen in words such as 𒀭𒍪𒀭𒍪 *kat-ta* 'with, along, down' (cf. Greek $\kappa\alpha\tau\alpha$ *katà*) and 𒀭𒍪𒀭𒍪 *te-ek-ku-uš-ša-mi* 'I show, I present' (cf. Latin in *dicō* 'I say', Greek $\delta\epsilon\acute{\iota}\kappa\nu\nu\mu\iota$ *deîknumi* 'I show'), as opposed to words for 'eat' like 𒀭𒍪𒀭𒍪 *a-tu-e-ni* 'we eat', 𒀭𒍪𒀭𒍪 *a-da-an-zi* 'they eat', where the stem is invariably written with a single *tV* or *dV* sign (cf. Latin *edō* 'I eat').

For the continuants, the relationship between gemination and voicing is much less clear. To begin with, Hittite apparently only had one continuant in the dental-alveolar region, and its phonetics is very uncertain. This phoneme is always rendered by signs conventionally transcribed with *š* in the cuneiform syllabary—a phenomenon undoubtedly connected with the generally complex and shifting relationship between the *sV* and *šV* signs throughout the history of cuneiform. There was no */z/* in Hittite, but the cuneiform *zV* and *Vz* signs are used to represent an alveolar or dental affricate */ts/*, a palatalization of */t/* before */i/* or */e/*: e.g. in the third person singular present (“primary”) ending *zi* (as opposed to *-ti* in the closely related Luwian). Since

TABLE 3.8: Hittite Syllabic Signs and Values

	<i>a</i>	<i>e</i>	<i>i</i>	<i>u</i>	<i>a</i> ₋	<i>e</i> ₋	<i>i</i> ₋	<i>u</i> ₋
<i>p, b</i>	pa ba	be	bi	bu	ab		ib	ub
<i>t, d</i>	ta da	te	ti	tu du	ad		id	ud
<i>k, g</i>	ka qa ga	ki	gi	ku gu	ag		ig	ug
<i>ts</i>	za	zé	zi	zu	az		iz	uz
<i>s</i>	ša	še	ši	u, šú	aš	ěš	iš	uš
<i>x(x₂?)</i>	ha	h _é	hi	hy	a/i/uh			
<i>m</i>	ma	me	mi	mu	am		im	um
<i>n</i>	na	ne	ni	nu	an	en	in	un
<i>l</i>	la		li	lu	al	el	il	ul
<i>r</i>	ra		ri	ru	ar		ir	ur, úr
<i>w</i>	wa		wl ₅					
<i>y</i>	ya							
<i>Ø</i>	a	e	i	u, ú				

the *bV* and *Vh* signs occur both single and geminate, it is thought that Hitite may have preserved at least two spirants, voiced and voiceless, in the so-called “laryngeal” range—an important class of consonants first postulated for Proto-Indo-European solely on the basis of complex historical reconstructions (Saussure 1879), and subsequently discovered in Hitite, the only Indo-European language to have preserved them directly as distinct consonants.

For any of the adaptations of cuneiform, it is a priori plausible that the phonological system of the borrowing language could show a certain lack of fit with the representation possible in the borrowed writing system. For Hurrian, Elamite, and Uruartian, lacking any independent access to the languages' phonological structure, we can only guess at areas where this might be the case. In the case of Hittite, a member of a familiar language family, we are in a much better position to judge. Thus, in the cuneiform syllabary, word-initial and word-final clusters of more than one consonant cannot be directly represented; nor can word-internal clusters of more than two consonants. It seems probable, however, that at least some of each of these cluster types are possible in Hittite, and that VC and CV signs are sometimes used to represent single consonants. Thus $\text{𐎶} \text{𐎵}$ *pa-ra-a* 'forward' presumably represents /pra/ (cf. Latin *prō*); $\text{𐎶} \text{𐎵} \text{𐎠$ *li-in-ik* (stem *link-*) 'swear!' and $\text{𐎶} \text{𐎵} \text{𐎠} \text{𐎶}$ *ša-an-lā* (or $\text{𐎶} \text{𐎵} \text{𐎠} \text{𐎶}$ *ša-a-ab*, stem *šanḫ-*) 'seek!' represent /link/ and /sanx/; and although the standard cuneiform syllabary permits an unambiguous distinction between /i/ and /e/ at least in a limited number of contexts, for example, before /š/ and

after /n/ (𐎠 iš vs. $\llcorner$ eš; 𐎡 ni vs. 𐎢 ne), the distinction is not consistently observed in the corpus from which most of our texts come. Thus ‘blood’ is written both 𐎠 $\llcorner$ $\llcorner$ $\llcorner$ *e-eš-har* and 𐎠 𐎣 *iš-har*. Finally, although geminate (so-called *plene*) writing of vowels can be used for long vowels in Akkadian, the frequent, but sometimes inconsistent, writing of double vowels in Hittite does not seem to correlate with length. On the one hand, the consistent $\text{𐎶}\llcorner\llcorner$ *e-ē-zī* ‘is’ corresponds to a short vowel in Indo-European (cf. Latin *est*), but on the other hand there are many words with variations of the type $\text{𐎶}\text{𐎵}\text{𐎶}\llcorner\llcorner$ *pa-aḫ-hu-u-ur* ~ $\text{𐎶}\text{𐎵}\text{𐎶}\text{𐎵}\text{𐎶}\llcorner$ *pa-aḫ-hur* ~ $\text{𐎶}\text{𐎵}\text{𐎶}\text{𐎵}\text{𐎶}\llcorner\llcorner$ *pa-aḫ-hu-u-ur* ‘fire’.

Signs functioning as syllabograms account for the bulk of running Hittite text. However, in addition to syllabographic function (which in any case, as we have seen, only involves about 150 of the 375 signs), as in contemporary Akkadian, each of the cuneiform signs used in Hittite has at least one, and sometimes several, logographic values, and 41 signs function additionally as determinatives. The largest number of logographic values are carried over either directly from Sumerian, or from the scholastic elaboration of Sumerian in the Akkadian scribal schools. For example, the sign Ψ šá has, in addition to its syllabic value, the logographic values níg 'thing; four'; NINDA 'bread', and GAR 'set, put'—moreover, these values themselves figure in compound expressions such as Ψ 𐎶𐎵 níg.sá 'justice', Ψ 𐎶𐎵 níg.ba 'gift', Ψ 𐎶𐎵 NINDA.KU, 'sweet bread', and Ψ 𐎶𐎵 NINDA.KASKAL 'voyage provisions'. These logograms are referred to as *Sumerograms*, and are usually printed in capital letters in Hittite transliterations. More than 1500 Sumerograms are known, of which several hundred were in common use. In addition to the Sumerograms, the Hittite scribes also used a smaller number (about 150) of *Akkadograms*, syllabically written Akkadian words or word elements (such as suffixed possessive pronouns), usually printed in capital italics in transliterations: 𐎶𐎵 𐎶𐎵 I-NA 'in' (= Hittite *anda*), 𐎶𐎵 𐎶𐎵 IŠ-PUR 'he sent' (= Hittite *hatrāiš*), 𐎶𐎵 𐎶𐎵 DI-NAM 'judgment (acc.sg.)' (= Hittite *hanneššar*). For a number of expressions written only in logograms, the underlying Hittite lexical items are unknown or uncertain.

Finally, a number of Hittite words are written in a mixed logographic-syllabic system, whereby a Sumerogram or Akkadogram can be followed by a syllabogram (sometimes referred to as a *phonetic complement*), usually representing inflectional information—either Akkadian or Hittite. A variety of combinations are possible (where SG = “Sumerogram,” AG = “Akkadogram,” PC_{akk} = “Akkadian phonetic complement,” PC_{hit} = “Hittite phonetic complement”):

$\text{SG} + \text{PC}_{\text{akk}}$ $\text{𒂗𒍪} - \text{I} - \text{𒈬} - \text{TU}$ ‘hand (gen.)’
 (Akk. *QA-TU*, Hit. *ki-eš-ša-ra-aš*)

$\text{SG} + \text{PC}_{\text{hit}}$ 𐎧𐎶𐎵𐎥 LUGAL-*uš* ‘king (nom.)’
 (Hit. *ḫa-aš-šu-uš*)

$\text{AG} + \text{PC}_{\text{hit}}$ $\text{𐎧𐎶𐎵𐎥} - \text{EL-LAM}$ -*aš* ‘free (nom.)’
 (Hit. *a-ra-wa-aš*; N.B.: Akk. *ellam* is accusative)

$$\text{SG} + \text{PC}_{\text{akk}} + \text{PC}_{\text{hit}}$$

As a final refinement, these mixed logographic-syllabic writings standing for Akkadian words can themselves be used in a syllabic function (so-called *rebus writing*, in proper names). On the one hand, the Sumerogram 𒌦^{gisPA} ‘scepter’, which stands for the Akkadian word /haṭṭu/, is given the syllabic value /ḥattu/; on the other hand, 𒌦^{gisPA} DINGIR-LIM, which stands for the genitive of ‘god’ in Akkadian, earlier /ilim/ but later /ili/, is given the syllabic value /ili/—as a result the writing 𒌦^{gisPA} 𒌦^{gisPA}-ši-DINGIR-LIM-iš is to be interpreted as *ḥattu-ši-ili-iš*, and can be used to write the name of the ruler Hattusili (which can also be written more conventionally 𒌦^{gisPA} 𒌦^{gisPA}-at-tu-ši-ili-iš).

SAMPLE OF HITTITE

[illegible]

In the Analysis, Akkadograms and Sumerograms are marked with subscript Akk and Sum respectively, and determinatives are superscript.

- [illegible]

'But because my father remained camped in the land Mitanni, and delayed in the camp, the festivals of my Lady the sun goddess of Arinna went unobserved.'
 — *Excerpt from the "Ten-Year Annals" of Mursili II (ca. 1353–1325 B.C.E.), found in Boghazköi (Figulla and Weber 1919, no. 4, lines 16–18).*

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SECTION 4

Egyptian Writing

ROBERT K. RITNER

The Egyptian script tradition is one of the world's longest, extending from the end of the fourth millennium B.C.E. to at least the tenth century C.E. During these four thousand years, four distinct but interrelated scripts were developed, often in complementary usage: Hieroglyphic, Hieratic, Demotic, and Coptic (see SECTION 22).

Hieroglyphic

Of these various scripts, none was as long-lived, or has so captured the public imagination (Iverson 1993), as Egyptian hieroglyphs. Indeed, hieroglyphs represent the fundamental Egyptian writing system, from which Hieratic, Demotic, and (to a lesser extent) Coptic are cursive derivatives. The common designation "Hieroglyphic" (from Greek τὰ ἱερογλυφικά τὰ *hierogluphiká* 'sacred carvings') was first applied by Clement of Alexandria (*Stromata* V.IV.20-21), while Herodotus termed the script τὰ ἱερὰ (γράφματα) τὰ *hierá (grámmata)* 'the sacred (letters)' (II.36). Such terminology corresponds to that of the native language, in which hieroglyphs were styled ꜥꜣꜣ *mdw-nṯr* 'god's-words', in recognition of the divine origin of writing; the invention of Thoth, the god of wisdom.

The Hieroglyphic script is pictographic in nature and was developed by the rebus principle at or just before the beginning of the First Dynasty (ca. 3100 B.C.E.) in close conjunction with a nascent artistic tradition. Bas-relief and accompanying text form an interdependent unit, in which depicted actions and individuals may be "read" as "ideograms" or "determinatives" for phonetically written names or titles. This representational character of Egyptian writing was continually exploited by scribes and theologians, resulting in the late misconception by outsiders that the script was purely "symbolic" and not phonetic. The development of writing in Egypt may be the result of "stimulus diffusion" by which Egypt gained the "notion of writing" through trade with Sumerians. However, it must be stressed that the Egyptian system is quite alien to the Sumerian and represents a distinctly local creation.

The distinguishing feature of the Hieroglyphic script is its consonantal basis. Unlike Sumerian, Egyptian pictograms are not syllabic, i.e. they neither write vowels nor indicate their presence. The contrary suggestion of a syllabic basis for Egyptian by the linguist Gelb (1963: 72-81) has found no Egyptological support (Schenkel 1984, cols. 717-18). The omission of vowels probably results from syllabic shifts such as